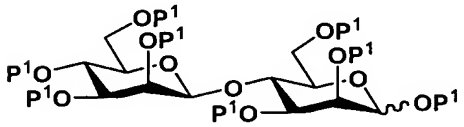
CLAIMS

1. A method for preparing a trisaccharide (Man β 1→4GlcN β 1→4GlcN) of the reducing terminal in the core sugar chain structure of an asparagine-linked glycoprotein, comprising

(1) a process of preparing a mannose disaccharide compound (a type of ManP^1 β 1→4ManP^1) of the formula (I)



(I)

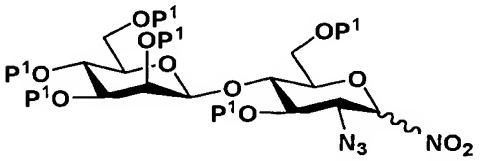
wherein P^1 is an OH-protecting group and the wavy line means that -OP^1 is linked at an axial or equatorial position or mixture of both,

by hydrolyzing a polysaccharide having mannose β-1,4-bonds and protecting OH groups of the resulting hydrolysate.

2. The method for preparing a trisaccharide (Man β 1→4GlcN β 1→4GlcN) of the reducing terminal in the core sugar chain structure of an asparagine-linked glycoprotein of claim 1, further comprising each of

(2) a process of preparing a glycal compound, in which mannose of the reducing terminal of the mannose disaccharide is converted to glycal, by halogenation and reduction of the mannose disaccharide (a type of ManP^1 β 1→4ManP^1), and

(3) a process of preparing an azide disaccharide compound (a type of ManP^1 β 1→4ManP^1) shown with formula (II) in which the 2-azide group of mannose in the reducing terminal is linked at the equatorial position;



(II)

wherein P^1 is the same above, the wavy line means that –NO_2 is linked

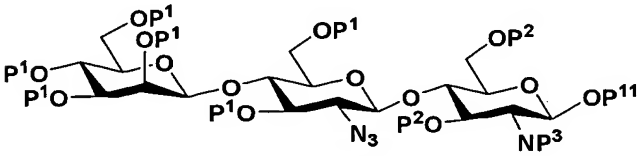
at an axial or equatorial position or mixture of both,

by azidenitration reaction of the glycal compound above.

3. The method for preparing a trisaccharide (Man β 1→4GlcN β 1→4GlcN) of the reducing terminal in the core sugar chain structure of an asparagine-linked glycoprotein of claim 2, further comprising

(4) a process of substituting the nitro group of the azide disaccharide compound (a type of ManP^1 β 1→4ManP^1) with a leaving group, and

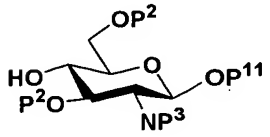
(5) a process of preparing a trisaccharide compound (a type of Man β 1→4GlcNP^1 β 1→4GlcNP^2) shown with the formula (III);



(III)

wherein P^1, P^2, P^3 and P^{11} are the same above,

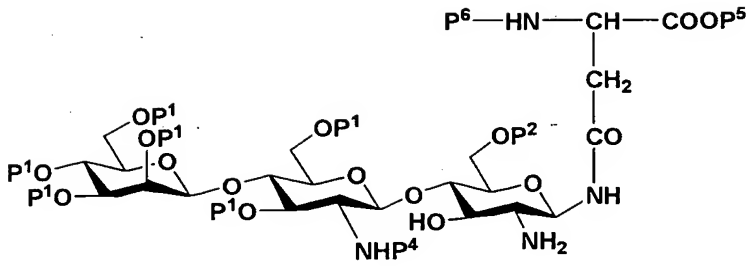
by a reaction of the product having the leaving group with amino-protected glucopyranoside shown with the formula;



wherein P^2 is an OH-protecting group, P^3 is an amino-protecting group and P^{11} is an OH-protecting group.

4. The method for preparing a trisaccharide (Man β 1→4GlcN β 1→4GlcN) of the reducing terminal in the core sugar chain structure of an asparagine-linked glycoprotein of claim 3, further comprising

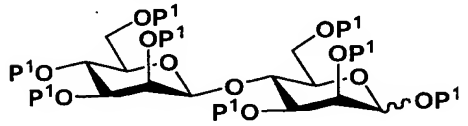
(6) a process of preparing an asparagine-linked trisaccharide (Man β 1→4GlcNP^1 β 1→4GlcNP^2) compound shown with the formula (IV);



(IV)

wherein P^1 and P^2 are the same above, P^4 and P^6 are independently amino-protecting groups and P^5 is a carboxyl-protecting group, by coupling of the reducing terminal of the trisaccharide compound above with the protected asparagine derivative.

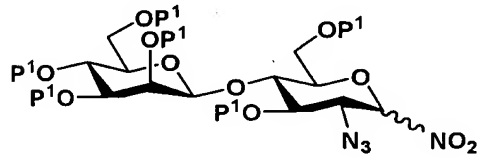
5. A method for preparing a mannose disaccharide compound (a type of ManP^1 β 1→4ManP^1) shown with the formula (I);



(I)

wherein P^1 is an OH-protecting group and the wavy line means that -OP^1 is linked at an axial or equatorial position or mixture of both, by hydrolyzing a polysaccharide having mannose β-1,4-bonds and protecting OH groups of the resulting hydrolysate.

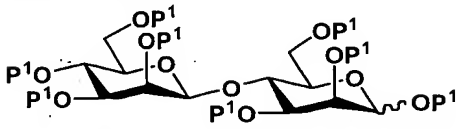
6. A method for preparing the azide disaccharide (a type of ManP^1 β 1→4ManP^1) shown with the formula (II) in which the 2-azide group of mannose in the reducing terminal is linked at the equatorial position;



(II)

wherein P^1 is an OH-protecting group, and the wavy line means that –NO_2 is linked at an axial or equatorial position or mixture of both, comprising a process of preparing a glycal compound, in which mannose of the reducing terminal of the mannose disaccharide is converted to glycal, by halogenation and reduction of the mannose

disaccharide compound (a type of ManP^1 β 1→4ManP^1) shown with the formula (I);

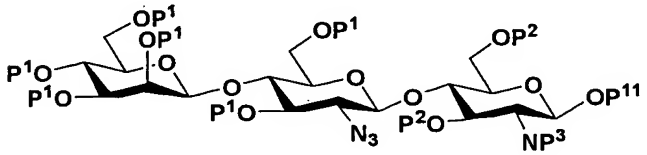


(I)

wherein P^1 is the same above and the wavy line means that -OP^1 is linked at an axial or equatorial position or mixture of both,

and subsequent azidenitration reaction of the glycal compound.

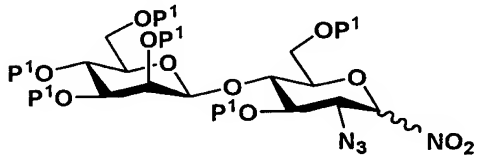
7. A method for preparing the trisaccharide compound shown with the formula (III);



(III)

wherein P^1, P^2, P^3 and P^{11}are the same above,

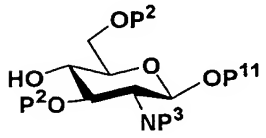
comprising a process of substituting the nitro group of the azide disaccharide compound (a type of ManP^1 β 1→4ManP^1) shown with the formula (II) with a leaving group;



(II)

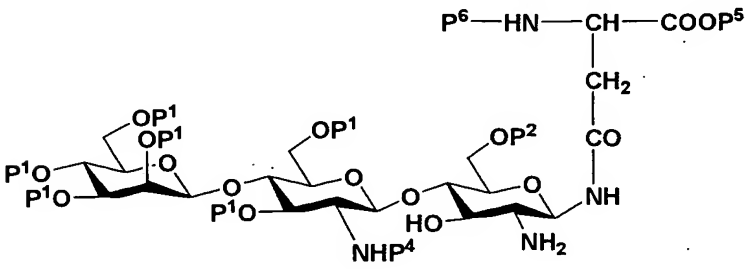
wherein P^1 is the same above, the wavy line means that –NO_2 is linked at an axial or equatorial position or mixture of both, and the 2-azide group of mannose in the reducing terminal is linked at the equatorial position,

and next, reacting the substituted compound having the leaving group with amino-protected glucopyranoside of the formula;



wherein P^2 is an OH-protecting group, P^3 is an amino-protecting group and P^{11} is an OH-protecting group.

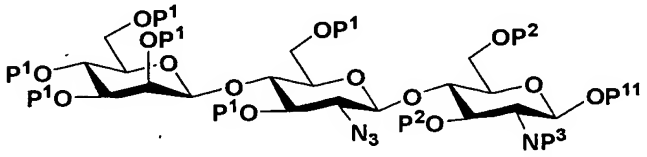
8. A method for preparing an asparagine-linked trisaccharide compound (Man β 1→4GlcNP^1 β 1→4GlcNP^2) shown with the formula (IV)



(IV)

wherein P^1 and P^2 are the same above, P^4 and P^6 are independently amino-protecting groups and P^5 is a carboxyl-protecting group,

by coupling of the reducing terminal of the trisaccharide compound (III)

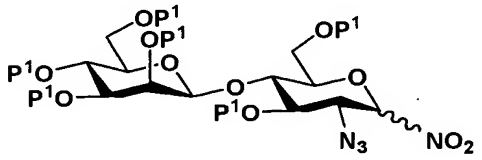


(III)

wherein P^1, P^2, P^3 and $P^{11}$are the same above,

with a protected asparagine derivative.

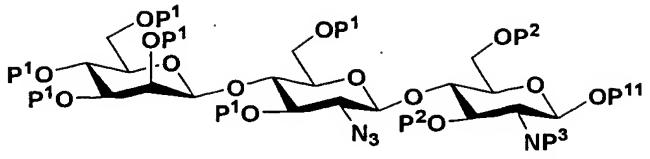
9. The azide disaccharide (a type of ManP^1 β 1→4ManP^1) compound shown with the formula (II);



(II)

wherein P^1 is an OH-protecting group, and the wavy line means that $-NO_2$ is linked at an axial or equatorial position or mixture of both.

10. The trisaccharide compound (a type of Man β 1→4GlcNP^1 β 1→4GlcNP^2) shown with the formula of (III);



(III)

wherein P^1, P^2 and P^{11} are OH-protecting group, and P^3 is an amino-protecting group.